

REMARKS
UPON THE VALUE OF AUSCULTATION
IN THE DIAGNOSIS OF
DISEASES OF THE CHEST,

A PRIZE ESSAY,

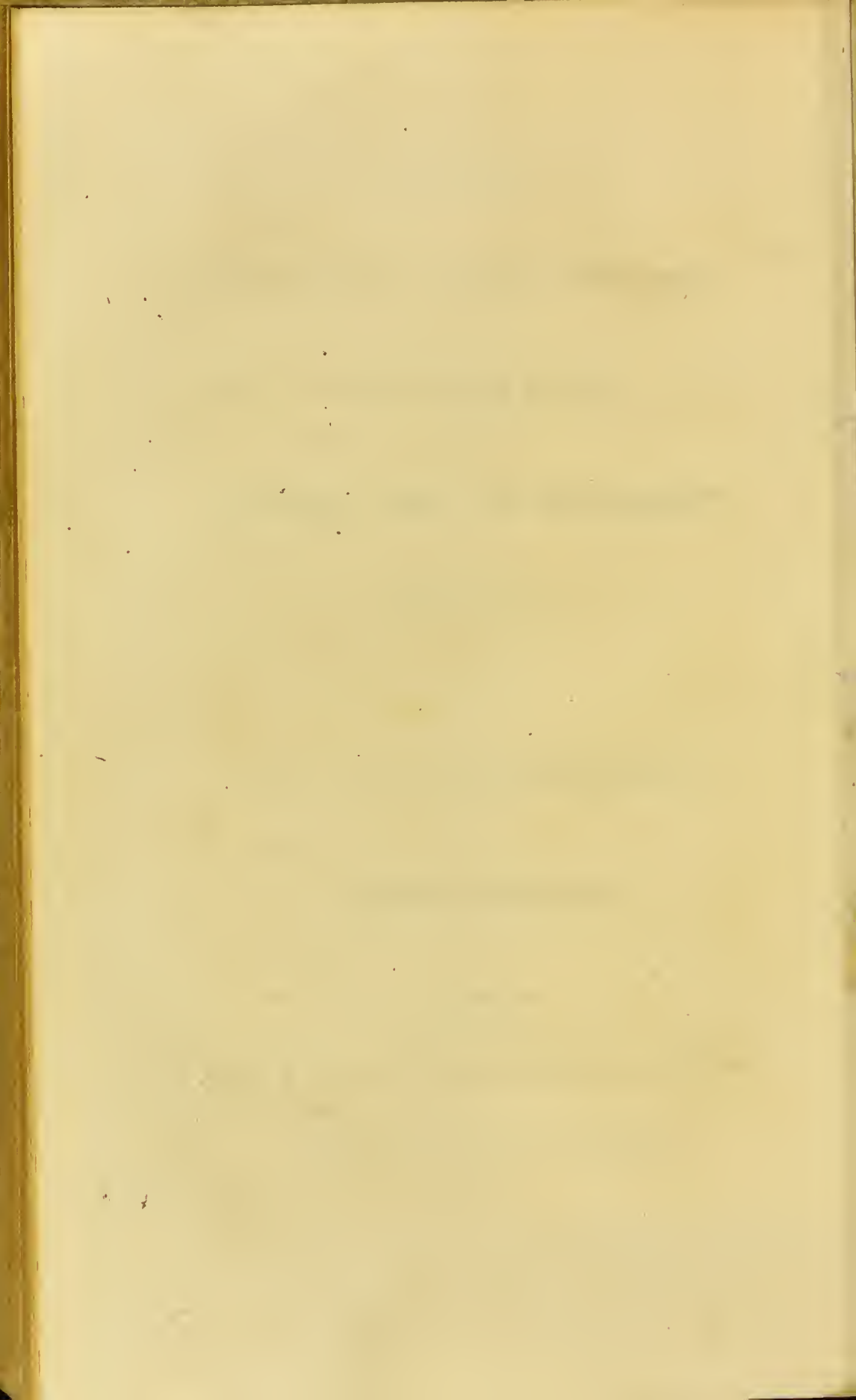
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*Remarks upon the value of Auscultation in the
diagnosis of Diseases of the Chest.*

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IF any class of diseases calls more than another for the attention of the Physician, it is that comprising the affections of the respiratory organs, and this for one or two reasons. There are few derangements of the system which do not of consequence induce affections of the lungs, whether these latter be looked upon as symptomatic or an extension of the inflammation from the part primarily affected. But, of all others, the disorders of respiration are the most frequently idiopathic, indicative of primary alteration in the organ. In studying the diseases and affections of the circulatory system, we are not arriving at such definite knowledge; so many other symptoms, that must be referred to alterations in the condition of different parts of the body, are declared along with these that we are not certain whether we are really regarding the primary disease. Hence it is, that we have so many speculations on the subject of fever, each author treating as its cause that pathological alteration that has

most engaged his own attention, or to which he has principally directed it in order to favour a preconceived opinion. Hence comes too the diligent labour of nosologists, who, holding a symptom to be a disease, find wherewithal to furnish forth a voluminous system, and present us with a study more difficult than the study of medicine. But in diseases of the respiratory organs, although other affections be involved, these latter are only secondary in degree, not calling for relief except through the system principally deranged. Here the most superficial pathologist looks at once from symptoms to the part affected, and in his therapeutic means attempts to meet a certain altered condition of the lungs. To determine what were these alterations induced by disease in the organs of respiration, Physicians until lately had only the means of post mortem examination; in patients affected during lifetime with a certain set of symptoms, dissection demonstrates, a particular alteration of parts; a relation is then established between the symptoms and diseased appearances, and so we arrive at a definite knowledge, and get a nomenclature not to be varied by the diffe-

rent views of symptomatologists. But, although post mortem examinations have shewn us the different stages of diseased alteration, no relation can constantly and regularly be established between these and the different degrees of intensity of the symptoms. This is an assertion however that requires proof, and it may be drawn perhaps from the course of the following observations. If such is the case then, and if we cannot always follow up the course of disease from the rational symptoms alone, there is no one who will not be glad to bring to his assistance additional means, means that will better enable him to form an accurate diagnosis of the present condition of his patient. To day the most intelligent practitioners will admit that the mere lessons of what is called experience, which often consists only in the habit of doing the same thing, are insufficient without the rules derived from physiological reasoning, the positive information derived from pathological observation. And while the Physician of former times would probably have questioned the sanity of the man that bade him listen to the signs of disease, to day it is only the wonder of the Pathologist why auscultation

as a means of diagnosis was not long ago discovered. In a few years it has grown into the confidence of the profession, and if there are yet those who deny its utility, this can be no matter of concern, while the most enlightened of the profession are either themselves auscultators, or, acknowledging its value, urge it upon those whose studies they direct.

Auscultation or listening to the sound produced in the chest may be either mediate or immediate. The inconveniences of immediate auscultation will present themselves as soon as we attempt to put it into practice. Mere prejudices should be overcome, and yield to imperative duty, if it were not that another and a better mode is presented to us in mediate auscultation. It would not be difficult to shew that sounds will reach the ear with greater intensity through the Stethoscope, than if we apply it directly to the chest; in the latter case we hear them because they reach the ear before they are expended upon the surrounding air. But in passing through the Stethoscope they are increased by reflection from the tremulous sides of the tube itself impelling forwards the particles of air, and also by the

sides of the instrument presenting in every point new sources of the propagation of sound. Mediate auscultation then is employed as the best means of distinguishing the different sounds produced within the chest. When the respiration differs from the state of health, the respiratory murmur may be puerile or bronchial ; it may be accompanied by different rattles ; or these rattles may be heard alone. When the resonance of the voice is affected, it may be either increased or diminished in intensity or altered in tone ; the murmurs produced during the act of partially impeded respiration are called 'râles,' or rattles. These are the *mucous* and *gugbling*, the *sonorous* and the *sibilous*.

The 'râle muqueux', or *mucous rattle*, is caused by the passage of air through fluid collected in the bronchi, or through the softened matter of tubucles ; in the latter case it is called 'gargouillement' or *gugbling*, the difference between the two is only one of degree : the mucous rattle will be recognized upon the first time of hearing it by recollecting that it is only the diminutive of the tracheal or death rattle. The

crepitating rattle is produced in the minute terminations of the bronchi or the pulmonary vesicles. It is caused by the passage of air through fluid effused in these parts; This 'râle' has been compared to the crackling of salt thrown upon the fire; M. Andral likens it to the noise made by crushing or crumpling a piece of parchment in the hand. It is really but the diminutive of the mucous rattle, and so having an idea of the first we can easily form one of this. The 'rale ronflant' or sonorous rattle is caused by some change in structure of the tubes themselves. It has been compared to the cooing of a pigeon or the noise of snoring, it may be considered as the diminutive of the croupy respiration. The *sibilous rattle* is produced by the air passing over viscid mucous lining the smaller bronchi; it is sometimes inaudible at intervals, and is often not heard during the whole act of respiration, it resembles somewhat the chiruping of young birds. The *bronchial respiration* is, as the name implies, the sound of respiration in the bronchial tubes. This becomes audible in disease with different degrees of intensity, when, from the compression or en-

gorgement of the vesicular structure of the lungs and small bronchi, the passage of the air is confined to the larger tubes, and the noise of this rendered more sensible without from the altered structure of the lungs, or, from effused fluid between these and the parietes altering the medium. For, as solid bodies convey sound better than air, the lung solidified or engorged must transmit the respiratory murmur better than the lung distended with air: and, add to this, that the same cause which altered the condition of the lung must also, by closing them up, prevent the air from traversing the vesicles and minute bronchi, but confine it to the larger tubes, which from their construction and dimensions, will give out the sound better and unaccompanied by the noise of the vesicular expansion. The *cavernous respiration* is only a high degree of this; it has been supposed constantly to indicate the existence of a tubercular cavity in the lung communicating with a tube. But it is present in other cases; and is distinctly heard in circumscribed dilatation of a bronchial tube as pointed out by M. Andral. We can get a sufficient idea of these sounds by

listening through the Stethoscope to the passage of the air through the larynx. An unnatural reverberation of the voice, so that it reaches the ear with different degrees of intensity through the Stethoscope, gets the name of *bronchophonism* or *pectoriloquism*. The resonance called bronchophonism is to be explained in the same way as the bronchial respiration. *Pectoriloquism* has been considered pathognomic of resonance in a pulmonary cavity, but it will be found to exist in other cases, and it is at all times hard to be distinguished from well marked bronchophonism. In pectoriloquism the voice is said to traverse the tube and strike distinctly on the ear. *Ægophonism* is produced by the sound of the voice passing through fluid effused between the lung and the parietes of the chest; it is tremulous, bleating, and, in patients of a grave voice, it is said to resemble the smothered voice of Punch in the show. As in some individuals there is a loud bronchial resonance and respiration in the infra clavicular and scapular regions, and towards the roots of the lungs, it will be necessary to auscultate both sides before arriving at any conclusion

from these phenomena. The *cough* has also, like the voice, and under the same circumstances, a particular resonance, so that it may be called *bronchial* or *cavernous*. The act of coughing too by exciting or agitating the fluid in cavities makes the gurgling to be more distinctly heard, and by removing this fluid restores the pectoriloquism, which might have been suppressed from the circumstance of the cavities being filled or nearly so. The 'tintement metallique' or *metallic tinkling* is perceived during respiration, coughing and speaking, but more distinctly during these latter. It is said to resemble the dropping of a grain of sand into a glass or metallic vessel; it is present when there is an effusion into the chest complicated with pneumothorax, and the containing cavity communicates with a bronchial tube by a fistulous opening. It is sometimes heard too when a large tubercular cavity having a tube opening into it is only partly filled with matter. In shortly viewing the diseases of the chest that are of most frequent occurrence, and call most imperatively for the diagnosis of the Physician, we can consider the common

symptoms that direct the practitioner independent of auscultation and inquire into their sufficiency; we can then try severally the signs afforded by the Stethoscope and determine their value as certain and constant indications. By this method it will be easy perhaps to shew that great difficulties lie in the way of our arriving at a conclusion by the employment of either means separately. And, if we must hold the opinion that the diagnosis derived from rational symptoms diligently arrived at is more certain, and the practice founded on it more frequently efficacious, we do not compromise our consistency when we at the same time uphold the value of mediate auscultation. The light drawn from it will certify beyond all doubt the experienced practitioner and will make that positive which even with him was before conjecture; while to the junior, it will, by its diligent employment, make up in some measure for a deficiency of experience in in symptomatology. But it is never to be supposed that it can dispense in any measure with this latter, or be of much use without comparing its indications with those derived from an

attentive observation of the rational symptoms.

Bronchitis as a generic term is perhaps a better one than that used by M. Laennec, 'Catarrh'; this latter when explained only designates a symptom, and as that symptom is not always present in the cases where we would still be obliged to use the term, we are so led into a kind of absurdity when we speak of a dry catarrh. It will be found too that the catarrh when it exists is not constantly in relation to the severity of the bronchitic affection. But the term bronchitis is open to the same objection, as, when the catarrhal symptoms have been most severe, there is often but little pathological evidence of inflammation. Besides a slight irritation of the larynx, trachea, or bronchi which is of most frequent occurrence, is thus designated by a name that is not in reference to its real importance. However, understanding by bronchitis any alteration of the air tubes from their natural or physiological condition, we have a general term under which we can bring the catarrhal affections of M. Laennec. The mucous membrane of the bronchi is not so liable to irritation and inflammation as that of the tra-

chea and larynx. Neither is ulceration as common a consequence in the former as the latter.

Redness more or less extended and of different shades according to the nature of the congestion ; thickening of the mucous membrane and consequent narrowing of the tube ; dilations, either circumscribed or not, are the most common lesions of the bronchi that are detected by post mortem examination, while it often happens that there is no pathological appearance to account for severe catarrhal affections. To pronounce upon the existence of these during life time would add something to the confidence with which we directed our therapeutic means, if we understood what degree of danger constantly attended each, or if in fact the severity of the disease was regularly marked by the nature of the lesion. But this every day's experience will teach us is not the case. In order to be useful then in directing our practice, it is not necessary that the Stethoscope point out constantly the nature of the alteration in the bronchi: if we learn from it that the bronchi, are affected at all, and these only, and also the extent of the affec-

tion, there are few who will consider that its application was useless. For it can be shewn by inquiring into each of the rational symptoms that they are sometimes insufficient for detecting any affection of the bronchi at all, and often quite incapable of declaring its intensity. Symptoms that are common to several diseases of the chest can not make us certain which of these at present exists.

The common catarrhal affection that is only marked by slight febrile excitement coryza and then an irritation of the larynx exciting cough and sometimes a slight pituitous expectoration, need not be considered here; it usually yields to domestic treatment and seldom calls for the attention of the Physician. But when there is much cough and this aggravating a pain that is usually slight at first and seated behind the sternum, but afterwards extends over all the chest; when the expectoration is more profuse, more viscid at first, and afterwards becomes opaque and finally less viscid; when with this there is some fever, the patient is said to have bronchitis. It is easy to perceive that the

cough can never be looked upon as a pathognomic sign of mere bronchitis, when it exists equally in so many other affections of the lungs. Although we may admit that in all those cases there is an alteration in the condition of the bronchi, and that this is the cause of the cough. But here the affection of the bronchi is only secondary and is not the disease to be treated. Cough then is not a sign of pure bronchitis or bronchitis uncomplicated with some other and perhaps severer disease. The character of the expectoration will not be a more certain sign; for the varieties of this as seen at the different stages of the affection resemble that which is found in many others. Thus in the commencement of bronchitis the sputa are transparent and watery; they are the same in *œdema pulmonum*. At a more advanced stage they become viscid, remaining still transparent. This is more characteristic, but when the viscosity increases it is impossible to distinguish such sputa from those which are expectorated sometimes at the commencement of pneumonia. Whenever there is an aggravation of the fever attending bronchitis the viscosity be-

comes thus increased; and then, as pain often exists at the same time, we have almost all the rational symptoms of pneumonia. At a still further advanced stage when the matter expectorated is opaque, yellow, or greenish, we may yet mistake it for that of the second stage of pneumonia. For M. Andral has shown that these different shades of colour exist in the pneumonic sputa according to the quantity of blood that tinges them. And when these yellow sputa lose their viscidty and become completely puriform, as they do in chronic bronchitis we will find it very hard to distinguish them from pus or the softened matter of tubercles. Besides the expectoration may be altogether absent, or it may be so sudden and so profuse as to be brought up by one convulsive effort, of which two or three instances have been related by M. Andral. In this latter case vomica would probably have been the term used to explain the occurrence.

Dyspnœa is so obviously common to all pulmonary affections and so frequently met with when there is no primary derangement of the lungs, that it is not worth dwelling upon. It is

true that the assemblage of these symptoms will make the diagnosis easier, and that the history of the case will then make it pretty certain. But these symptoms, which are seen not to be pathognomic of the disease, are not, either essential to it; and, even if they all exist, they are not often sufficient to distinguish it from pneumonia. Besides when the bronchitis becomes chronic and an abundant expectoration induces marasmus, it will be hard to distinguish it from phthisis, and add to all this, that most of the symptoms of bronchial irritation are frequently kept up in the lungs by the presence of crude tubercles, that we have no way of discovering by the rational symptoms at the very time that it can only be important to do so. Even when we have determined upon the existence of bronchitis, we can not from the rational symptoms alone judge of its intensity. We find in some cases such high fever that the pulmonary affection is overlooked in the treatment of the general disorder; while at other times the fever being less, the attention is called more to the bronchitis and then the fever is considered secondary to this and called 'catarrhal

fever.' Post mortem examination will often determine in both cases an equal degree of intensity in the local affection.

If we now look to the physical signs, we will find that they are much more positive, and in many cases pathognomic, but still present their difficulties. In the commencement, before any expectoration is established, there is usually to be heard a mixture of the sonorous and sibilous rattles. These are sometimes heard in *œdema pulmonum*, but we could hardly confound this affection with bronchitis. If the disease goes on a mucous secretion is established; this more or less obstructs the passage of air in respiration and so induces the mucous rattle. This may be considered a certain sign of mucous secretion from the bronchi; if the symptoms are acute it will indicate the second stage of the disease. It is present likewise in chronic bronchitis, when the bronchi are loaded with mucous, a condition that is one of the many called asthma, and when the dyspnœa is only to be relieved by detecting its cause, By listening attentively to this rattle we can get an idea of the size of the bubbles that are

broken as the air passes through the mucous. From this we can judge of the size of the bronchi that are affected and the viscosity of the fluid. Then, as the disease becomes more severe the more it approaches the terminations of the bronchi, and more acute in proportion to the viscosity of the mucous, we thus learn at once the nature of the disease; its extent, by the extent of surface over which the rattle is heard; and its danger and intensity by what may be called the size of the rattle. But this circumstance, that with a great deal of experience in auscultation is favourable to our forming an accurate diagnosis, is the very one that with less tact makes it so difficult to distinguish bronchitis from some other diseases. In pneumonia the crepitating rattle is considered the pathognomic sign of its first stage. In phthisis the gurgling rattle is indicative of softened cavities; of tubercular matter. Now these three are but degrees one of the other; and it is easy to conceive how the mucous rattle running into the minute bronchial tubes may resemble the crepitating, and this so nearly as to be distinguished from it with difficulty; on the other

hand tubercular matter will sometimes be contained in small cavities all over the lung; and in this case the sign indicating its presence will differ but little from a mucous rattle in the larger tubes. At all times then it will be found difficult to distinguish the degrees of this rattle to which we give the names *crepitating*, *mucous* and *gurgling*, and yet each of these is the sign of a different disease which it is important to determine. Neither can the nature of the rattle, considered by itself well declare the stage of the affection, or shew whether it be acute or chronic. For as there may be an increased secretion or exhalation from a surface not in a state of acute inflammation, so we may have the mucous rattle when there is an excessive exhalation of mucous from the lining membrane of the bronchi affected with a very low degree of inflammation. From all this it would appear that the rational symptoms alone are not at all times sufficient to detect the presence of bronchitis and distinguish it from other diseases. While even when we are certain of its presence, they are not able, under many circumstances, to show its intensity and to point out

to us the urgency of the case. On the other hand the signs presented by the Stethoscope are often difficult of distinction from the Stethoscopic signs of other diseases ; and those which are least equivocal are yet, not able of themselves, constantly to shew us what is the severity of the disease. In auscultating a patient affected with the chronic bronchitis, phenomena often occur that are considered pathognomic of other diseases, such as pectoriloquy from considerable dilatation of the bronchi ; suppression of the respiratory murmur while the resonance of the part on percussion remains, which is supposed to indicate pneumothorax or emphysema pulmonum. This perhaps is sufficient to shew the difficulty of forming a correct diagnosis, except by the conjoint means of auscultation and a practised observation of the rational symptoms. Now although a case of bronchitis escaping notice may go untreated and yet do well, the contrary will often happen and an affection which was at first either overlooked or but little attended to, may ultimately become chronic and favour the developement of tubercles, where there preexisted such a disposition ; or

this chronic bronchitis may become so established as to be beyond all means of cure, in some instances wearing down the patient by being the source of a constant and profuse secretion, in others inducing that extreme dyspnœa, which is aggravated at certain periods and always increased by a fresh accession of cold. Pneumonia too is a frequent consequence of a bronchitis that was neglected or treated too lightly when we were not aware of its intensity.

Pneumonia and pleuropneumony were names used to designate the same affection before the nature of it was yet well understood. It was only from pathology that we got a real notion of the disease and found that the symptoms said to indicate it were at best but equivocal and some of them not really belonging at all to inflammation of the lungs. Dr. Cullen has not distinguished the symptoms of pleurisy from those of pneumonia. But it is not necessary to regard pleuritis as a part of the disease that we would treat of under the name *pneumonia*. By this term we would understand merely inflammation of the pulmonary parenchyma. A ques-

tion arises here, whether we are to regard as the parenchyma the inter vesicular cellular structure or the vesicles themselves. The latter seems more probable, and will be here assumed as that which best explains and accounts for the characteristic signs of its inflammation, at the same time that it is supported by the appearances of the disorganized lung, although not actually demonstrated. According to this view inflammation occurring in the vesicles of the lungs, determines there a mixed secretion of blood and mucous ; and this taking place over a certain extent of lung, causes in that place an obstruction to the free passage of the inspired air. Upon opening the chest it does not collapse like the sound lung, but remains distended by its liquid contents ; and when we cut into it a frothy fluid comes out, which, by pressure may be altogether removed leaving the lung in its natural condition, if we except some redness of the walls of the bronchi and vesicles. In this state the part still crepitates upon pressure ; for, we have seen that the air is not completely excluded but passes into the vesicles rendering the fluid frothy. This is

the congestive or first stage of pneumonia, which may vary in degree until it passes into the second stage, termed by M. Laennec hæpatization by M. Andral 'ramollissement rouge' In this the fluid secreted becomes so viscid and tenacious as to prevent expectoration; it then remains in the vesicles distending them, getting from them the shape of granular bodies and consolidating the lung. If we examine a part in this stage of inflammation it will be found more or less firm, no longer crepitating upon pressure, and, though sometimes a slight pressure will cause it to break up, we cannot by this means press out any fluid from its cut surface as before. M. Andral objects to the term hæpatization. He thinks the appearance of a lung in the second stage of pneumonia may be explained better by a comparison with the spleen than the liver. Perhaps it will be found that in those instances where the inflammation has been very acute, has run the most rapid course, the consistence will resemble that of the spleen, while in the generality of cases, and in all those that are of any lengthened course, 'hepatization' is the term that will best apply.

In the third stage the lining membrane of the vesicles begins to secrete purulent matter. This induces the condition called by M. Andral 'romollissement grise.' But it will not always be found of such little consistency as to deserve that name; besides the colour is not grey, but yellowish grey or ash coloured. At first this state only differs from the second or that of hepatization in colour, it has the same granulated appearance upon being torn. But afterwards this structure becomes softened down, and the lung is as it were broken up by a purulent infiltration. A cavity containing a fluid and resembling an abscess is easily made by pressing upon a part of this softened structure. Abscesses of this kind are perhaps often made in removing the lungs from the chest with some violence. Dilated bronchial tubes secreting a quantity of puriform fluid, softened tubercles, and interlobular pleuritis must go with these to account for the frequent mention of abscesses by former practitioners—abscesses that they considered as a common termination of pneumonia. Inflammation usually begins in the lower part of the lungs, and

going on here, while it extends gradually upwards, we have sometimes the three stages of it in one lung, and commonly the first and second. Inflammation may exist too in different degrees in part of both lungs.

Pneumonia is one of those diseases that requires the most decisive treatment; it is consequently of importance to detect its presence at once and to ascertain its daily progress. It will be readily admitted, or if not, it can be easily shown that there is some difficulty in doing all this while we consult rational symptoms alone. Nothing can be more irregular than the way in which it sets in, sometimes it is preceded by shivering followed by pain of side; sometimes there is no pain of side at first or even throughout the course of the disease; sometimes a bronchitis runs into a pneumonia which we have no way of discovering except by auscultation. This is of very frequent occurrence, and here the increased intensity of the symptoms will not declare the inflammation of the parenchyma, for this may be referred to an aggravation of the bronchitis. Sometimes again the inflammatory fever is so

high as to call all our attention to it, and then the local affection is overlooked (supposing that we have not employed the Stethoscope) until the third stage sets in, or a considerable part of the lung becomes disorganized, and the patient is beyond all means of cure. Sometimes too the whole strength of the system being expended upon the local inflammation, there is an apparent general prostration that makes us treat the case as a low fever, and with tonics and stimulants add fuel to the real malady, while the general strength is consequently reduced by the means intended for its restoration. Febrile excitement, pain of side, dyspnoea, cough, tenacious and bloody expectoration are the symptoms of pneumonia.

The fever varies in degree according to individual temperament. In some persons a slight local irritation determines a high fever which is altogether disproportioned to its cause. The contrary will happen in other cases. So, in pulmonary inflammation, the disease will in some patients run its whole course without inducing an alarming degree of fever, fever that will draw our attention from the local affection, and then

death would rather be the result of the more or less complete disorganization of the lung, which had prevented the system from being properly supplied with arterialized blood. While in others the inflammation of the pulmonary parenchyma has hardly gone beyond its first stage and this is confined to a small part of it, when the patient sinks under a high inflammatory fever. *Pain* in the side only attends pneumonia when it is complicated with pleuritis. This it generally is, but, as it is not necessarily so, we cannot regard the pain as an essential symptom. Besides it is at all times an equivocal one, for as pleuritis may exist without pneumonia so may this pain. The *dyspnœa* cannot point out the nature of the affection being common to so many; neither can it show the intensity of the inflammation when we are aware of its presence, for its degree is not constantly determined by this latter circumstance but more frequently by peculiarities in individual constitution.

The *cough*, can in no case serve as a means of diagnosis. The patient is said to lie upon the affected side, but this can hardly happen

where there is pleuritic pain and at all times the position of the patient will be found to vary in different cases and under different circumstances. So that no rule can be established. But the most certain of all signs of pneumonia is the character of the *expectorated matter*. When its peculiar appearance is present, the nature of the disease is as certain as is the relation between any cause and effect that we know. But these characteristic sputa are not present in every case and sometimes there is no expectoration at all. It is easy to see then that the symptoms summed up by nosologists to give a definition of pneumonia are none of them essential to the disease. Neither will all of them united be sufficient to declare the nature of the pulmonary affection when the characteristic sputa are not present, unless the most attentive observation of a skilful practitioner be exercised upon them throughout the whole course of the disease; and even then we would say that the diagnosis will not *always* be verified by post mortem examination; peripneumony may be mistaken for a pleuritis; or it may be confounded with bronchitis, and a severe

disease be treated with inefficient means or altogether overlooked; and if this happen in a case of Phthisis the disease will be hurried on to a rapid conclusion under the influence of the neglected pneumonia and the patient, who might yet have lingered on amongst anxious friends and only left them when hope had died and affection chose rather to cling to the memory of the dead than to the shadow of existence, is now suddenly cut off just when moral nature, shining out through the infirmity of our grosser being, endears still more the withering flower blasted in the sunny hour of life and falling back almost upon the spot that it had graced.

The signs of peripneumony as presented by the Stethoscope are more certain in their indications, yet these too present their difficulties in application; difficulties however that can be removed by diligently studying the symptoms presented and comparing with these the physical signs. In this way we can in most cases arrive at a correct diagnosis and be so certified of it as to enable us to proceed with that decision in our therapeutic means which is most likely to secure success

Whenever there exists congestion ('engouement') of the lung which is considered the first stage of pneumonia the crepitating rattle is heard unless the inflammation is very partial and confined to a part in the centre of the lung, leaving healthy structure between it and the part of the chest to which the Stethoscope is applied. Besides then that pneumonia may *sometimes* be present in its congestive form without being declared by the crepitating rattle, this rattle may also be heard when a congestion exists without any inflammation as happens in dropsy of the lung, in the low stage of fevers or in the convalescence from these when the strength is exhausted, as also in the convalescence of protracted cases of pneumonia itself. In all these instances the general symptoms must of course determine whether the congestion be active or passive, whether the malady be acute or chronic. But there is another difficulty in the way of our drawing a conclusion from the presence of this crepitating rattle, the adjacent bronchi are invariably inflamed in pneumonia which inflammation often extends into the larger tubes, and, determining there an increased

mucous secretion, causes a loud mucous rattle which is sufficient to mask completely the crepitating rattle. Another circumstance further makes it difficult to distinguish pneumonia from bronchitis; this is that the two rattles run so much into one another that it is often impossible to make a distinction between them. However if it is very difficult to distinguish a case of severe bronchitis from one of pneumonia when some of its symptoms are absent; this is not of material consequence as most people will admit perhaps that the mode of practice in both cases must be the same. But there is one sign which, when united with the crepitating rattle and some fever, can make us physically certain as to the nature of the disease. It is the characteristic appearance of the sputa. In this, the first stage of pneumonia, the matter expectorated is viscid mucous intimately mixed up and combined with the blood in different proportions, and, according to the quantity of this latter, being either yellow, rust of iron colour or red. It is semitransparent and tenacious, but not so much so as to prevent its flowing out when we turn down the containing vessel.

This appearance is perfectly characteristic. It is not to be explained by saying that the sputa are bloody, for this is a condition common to many other diseases. But in these latter it can not strictly be said that the sputa are *bloody*. The blood is only brought up with and streaked through them. However this character of the expectorated matter is not always present. Sometimes too there is no expectoration; the patient swallowing his sputa, or, from extreme debility being unable to bring them up. In some cases where there is a very high degree of inflammation the muco-sanguineous secretion becomes so viscid as to be retained in the vesicles and minute bronchi, without being at any period expectorated, and then the inflammation rapidly passes into the second stage. Often the sputa have an extreme viscosity but differ little from those in the acute stage of severe bronchitis; while to an inexperienced eye the yellow or greenish yellow sputum, whose colour is in fact determined by the quantity of blood with which it is mixed, may differ little from the puriform sputum of the advanced stage of bronchitis. In all these cases we lose the assistance of

our most valuable means of diagnosis, and it is only by a close observation of the symptoms and repeated and attentive auscultation, that we can make ourselves certain of the nature of the disease. In a further advanced stage of the inflammation the crepitating rattle becomes still louder and is perhaps heard over a greater extent of the lung. It now completely masks the noise of the natural respiratory murmur. Soon the rattle becomes fainter, without being replaced by the respiratory murmur, and, upon percussing the chest in this place, the sound is duller. In a short time this rattle is no longer heard and the chest is observed to rise at each inspiration without being followed by the noise of the dilatation of the air cells. Hereabout too the chest gives out a perfectly dull sound upon percussion. The respiratory murmur in the sound part of the affected lung and in the other, if it is not engaged in the inflammation, is louder than natural giving rise to what is called the *puerile respiration*. In that part where there is no audible rattle or respiratory murmur, and where the sound is dull upon percussion, there is some bronchial respiration and

bronchial resonance of the voice. At this time the sputa become more viscid and tenacious, they now adhere to the vessel and cannot easily be turned out by subverting it. If their bloody tinge was marked at first, it now becomes more so. These may be looked upon as pathognomic signs of hepatization or the second stage of pneumonia. But the characteristic appearance of the sputa is not always present, and the physical signs are not sufficiently unequivocal. They can all exist in pleuritis with effusion; they may lead to the suspicion of pulmonary apoplexy or the existence of a large crop of crude tubercles, and, if we consider them separately, we will find there is great difficulty in their application. The dulness of sound is often inappreciable, as in men with large full chests well covered with soft parts and in those whose obesity prevents the vibration of sound from reaching the hollow of the chest. It will exist at both sides too when a pleuritic effusion has taken place at the side opposite to that of the hepatized lung; and whenever effusion does take place it always is at the opposite side. In cases of double pneumonia there will of course be no

difference between the sound at either side if both be in a state of hepatization. In partial pneumonia too, if the hepatization be towards the centre of the lung, this means will equally fail. The respiratory murmur will be absent also in pleuritis with effusion; the resonance of the voice that is heard in this too can most commonly not be distinguished from the same in hepatization. As to the puerile respiration this will as well exist in one kind of pulmonary lesion as another. It is only an effort on the part of the healthy lung to make up for the inaction of that which is diseased. When a part of the lung remains in the first or congestive stage of the inflammation, as most frequently happens, the diagnosis becomes much easier; and it is then that the stethoscopic signs will be found most valuable.

Should the inflammation go on until it reaches its third stage, this is rather marked by general symptoms than by any very characteristic physical ones. If the matter is collected into an abscess, which is of very rare occurrence, we have the same signs as a tubercular cavity affords in a case of phthisis. But if we regard the course

of the general symptoms, and do this attentively, at the same time that we repeatedly employ the Stethoscope and percussion, we can follow up the course of the disease with certainty, trace its progress from day to day and adapt our means accordingly.

To treat of all the symptoms that are at different times presented in pneumonia and the courses that it takes in different patients, would be to write an essay on the disease and undertake a task that was not proposed to the author of these remarks. The object of these, however imperfectly aimed at, is but to make it appear that the most common symptoms of pneumonia are none of them essential to it and may all but one exist in other diseases. That the signs derived from auscultation bring new light to our examination but are, taken individually, confused and of difficult application. And, that the value of auscultation in this disease of the chest is great in proportion to its obscurity, but is only useful when we employ it carefully and perseveringly and at the same time attentively study the history of the case and all the symptoms united.

But, it is in following up its course when we have once determined on the presence of pneumonia, that the Stethoscope becomes most useful. We have seen what are the physical signs presented to us as the disease progresses until it terminates in hepatization; and although the signs of solidification are somewhat obscure when we have not seen the disease in its commencement, yet they are equally positive as to the course and advance of the disease when once we have determined upon its nature. When the disease is to terminate in resolution we have the satisfaction of being able to trace the happy change from day to day while we look to the result with as much certainty as we wait the effect of any physical cause that we observe in operation. If the cure is effecting or the resolution is taking place before the inflammation had induced hepatization, the crepitating rattle wherever it existed becomes fainter and is gradually replaced by the natural respiratory murmur or sound of the pulmonary expansion. And when the inflammation commenced below and proceeded upwards, as it usually does, this change, marking

the return to health, observing an inverse order, begins above and proceeds downwards in proportion as the morbid condition yields to the restorative process. If the disease has gone on to hepatization, the signs of this in the same manner gradually yield to those indicating a return to health. The sound on percussion becomes by degrees clearer; at the same time a crepitating rattle begins to be heard and this in turn gives place to the natural respiratory murmur. This progressive alteration beginning superiorly, if the morbid process terminated there, and proceeding downwards marks exactly the return to health if the pneumonia has not been complicated with any other affection. There is yet another period at which auscultation is highly valuable and may prove a means of safety to many a patient that would otherwise have sunk under a treacherous re-attack of the malady returning upon a weakened organ. When the improvement in the general symptoms indicates convalescence, when the fever has subsided, the strength is returning and the functions are nearly natural, the watchful eye of the Physician is removed, and the

patient returns to his usual habits. At this time auscultation will often detect some remains or return of the crepitating rattle, and if the patient is longer neglected either a relapse, probably fatal, supervenes or a slow disorganization of the lung takes place.

This false convalescence may however be detected by an attentive observation of the patient. There is usually some accession of fever towards evening, and the pulse and breathing are hurried upon slight exertions. But this often is insufficient to fix our serious attention, which is only called on by an examination with the Stethoscope. The passive congestion of the lung that like dropsy after some fevers, often follows a severe and protracted pneumonia, is only to be discovered positively by the means of auscultation. So many advantages then are to be derived from the use of the Stethoscope in the course of an inflammation of the lungs, and practice will suggest many others in those complications of the disease, where it might escape the observation even of the skilful practitioner unassisted by the means of auscultation.

Pneumonia, bronchitis and passive congestions of the lungs are apt to occur in different stages of fevers. With those who in every case refer fever to a local inflammation or irritation and make the constitutional symptoms secondary, the inflammation of the bronchi or pulmonary parenchyma would stand for causes, unless they would choose to confer the privilege of fever making upon a particular organ and look upon these only as the result of a gastro-enteritis which first induced the fever. This is an arbitrary mode of proceeding. If an acute bronchitis or pneumonia be present and there be no manifest irritation of the stomach and bowels, to assume its existence and then refer the febrile symptoms to it, is only an attempt to make facts harmonize with theory that can but satisfy the inventor or those who are so indolent as to desire to take up the most abstract and general rule in order to supersede the necessity for enquiring into particular cases. Those who complimented the English Physicians with a disqualifying cognomen because they did not choose to generalize as much as themselves, will soon perhaps be obliged to look here for that

particular information which is to be derived only from a philosophical observation of facts.

It can not be denied by the most common observer of every day cases, that a local inflammation can excite a fever which will differ in severity according to the nature of the cause, the temperament of the patient and other circumstances. We see too how this inflammation may be transferred or continued to other parts or organs as in rheumatism, gout, erysipelas, burns or scalds; and we know that when the local inflammation is extended, the fever for the most part is increased in severity and that this increase is proportioned to the nature of the organ affected. When in consequence of a burn the chest becomes engaged and a high fever follows, it would be hard to say that then a gastro-enteritis also supervened when there are no symptoms of it, or, if there *are*, to refer the fever to this rather than to the pulmonary affection, or to either rather than to the first local impression. It is not easy to admit that a local impression must be transferred or continued to some particular organ before it can produce a general irritation, but every one

knows that fever is a common result of any inflammation of a part. However this may be, there is, we think no doubting the fact that fevers however induced determine inflammation to particular organs, and to those first that are disposed either by the quantity of blood that naturally circulates in them and consequently makes them more susceptible of impressions, or that have had blood determined to them by a previous inflammation. A patient who has once had a severe ophthalmia is liable to a recurrence of the disease upon being exposed to a cause inducing febrile excitement. M. Andral gives the case of a man who had fifteen attacks of pneumonia in eleven years. In measles affecting a patient who has frequently been the subject of catarrh, the fever spends all its virulence upon the lungs and the eruption comes out but badly. We every day see people in whom some part of the system becomes particularly impressed by an excitement of the whole. And it is thus we must suppose that in inflammatory fever some patients are affected with cephalitis or meningo-cephalitis; gastro-enteritis; hepatitis; nephritis; pleuritis; pneumonia; bron-

chitis &c. And, although we must admit that any of these organs may be primarily inflamed and induce the fever as a consequence, yet perhaps it is more easy to explain how inflammation of any of these may be determined by fever. But both we think must be admitted.

Pneumonia and bronchitis then are frequent attendants upon fever; and whenever this is the case there are obvious reasons why the Physician should direct his principal attention to the local affection. In the first place, the fever may be only the consequence of this, and it is then only to be treated by removing its cause; then, if the inflammation has been determined by the fever, the impression made upon a vital part will soon re-act upon the whole system and so increase the fever, which will in its turn cause inflammation of other organs. Again, the mere alteration of the respiratory organ from its physiological condition is a sufficient cause of death independently of the inflammation and fever. There is abundant reason then for wishing to detect pulmonary affections whenever they complicate fevers. If there be much dyspnoea, cough

and frothy mucous expectoration the practitioner even without the use of the Stethoscope, will suspect a bronchitis and use means against it; but, as there may be nothing more than these symptoms and sometimes not even these where a pneumonia is making rapid progress, surely it will be admitted that many a case may be treated too lightly and the practitioner only know how urgent it was when the hepatized lung is presented to him upon dissection. And it will not be said that the degree of fever will indicate the *nature* of the pulmonary affection, when it cannot even point out the severity of this when we have determined what it is. A severe acute pneumonia is sometimes going on when the fever presents low typhoid symptoms. In this case the cautious practitioner who halts between two opinions, and, while he deprecates the lancet is afraid to venture upon the old resource of stimulants, will allow the pulmonary disorganization to go on without making a step to arrest it; while the more decided practitioner who always meets such general symptoms with stimulants, by introducing them here, increases the local inflammation and by this

means adds to the general prostration and hurries the end of the patient. It is needless to say that in this case the Stethoscope alone points out the real state of things, and so, puts the question between stimulants and depletion fairly before the practitioner.

To point out all the advantages that are to be derived from auscultation, it would be necessary to treat fully of all the diseases of the chest—to show the obscurity of their symptoms and the consequent confusion of our knowledge in relation to them. It would be easy, proceeding in the same manner as above, to make it appear that the physical signs are obscure when considered by themselves and that their value is determined by the attention that is at the same time bestowed upon the general symptoms. But all this would oblige us to ask for more indulgence than the little we have already offered is entitled to.

FINIS.

